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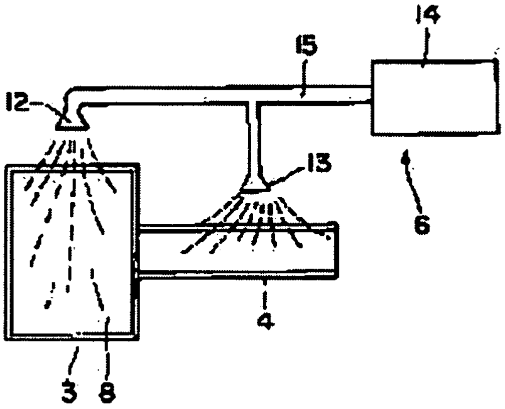
(54) POWDER SUPPLY DEVICE

(57)Abstract:

PURPOSE: To prevent scattering and sticking of powder, and effectively remove residual powder sticking to a powder hopper and a gutter part by injecting a humidified air into the powder hopper and the gutter part, and preventing electrification of the powder receiving vibration by an exciter.



CONSTITUTION: Humidified air is injected into an upper opening part 8 of a powder hopper 3 from a humidified air first injection port 12. The humidified air is sprayed to powder accumulated in the powder hopper 3, and static electricity electrified to the powder by vibration by an exciter is eliminated. The humidified air is also injected into a gutter part 4 from a humidified air second injection port 13. The humidified air from the humidified air second injection port 13 is sprayed to powder moving in the gutter part 4, and the static electricity electrified to the powder by vibration by the exciter is eliminated. In this way, scattering and sticking of the powder are prevented, and residual powder sticking to the powder hopper and the gutter part is effectively removed. Therefore, the powder can be

supplied to a receiving vessel by a precise quantity.

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CLAIMS

[Claim(s)]

[Claim 1] The fine-particles feeder characterized by coming to have the fine-particles aspirator which has the appearance which imitates the inner surface of the appearance which imitates the inner surface of a fine-particles hopper, and said gutter possible [insertion into said fine-particles hopper and a gutter] in the fine-particles feeder equipped with the gutter which transports the fine particles discharged from the fine-particles hopper arranged on a shaker, and this fine-particles hopper, and was equipped with fine-particles attraction opening, and the humidification air atomiser which inject humidification air to a fine-particles hopper and said gutter.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the fine-particles feeder which can clean suitably the metering installation which isolates fine particles preparatively to a precision in more detail about a fine-particles feeder.
[0002]
[Description of the Prior Art] There was a fine-particles feeder which combined the vibrating feeder equipped with the fine-particles feeder or shaker called the loss in way method which generally combined the vibrating feeder equipped with the shaker and the load cell as equipment which isolates a particulate matter preparatively to a precision conventionally and measures this, and the electronic balance.
[0003] It had the gutter which transports fine particles from the fine-particles hopper with which any equipment accumulates fine particles, and this fine-particles hopper.
[0004] Also in which fine-particles feeder, when isolating preparatively the fine particles from which a class differs and measuring this, the residual fine particles adhering to the inner surface of a fine-particles hopper and a gutter must be removed thoroughly. It is because it will have a big adverse effect on the precision as a result of analysis and measurement if the residual fine particles when measuring last time are mixing the fine particles measured especially when component analysis, physical-properties measurement, etc. are presented.

[0005] So, when the fine particles of a different class were isolated preparatively and this was measured, the fine particles adhering to a fine-particles hopper and a gutter were taken over, or attraction clearance of the fine particles was carried out with the vacuum cleaner.

[0006] However, since fine particles were charged by conveyance of the fine particles by the vibrating feeder, fine particles were thoroughly unremovable only by the wiping activity of a fine-particles hopper and a gutter, or the attraction clearance with a vacuum cleaner. Moreover, wiping actuation by handicraft or the attraction clearance actuation with a vacuum cleaner had barred automating thoroughly a series of actuation of a fine-particles feeder.

[0007] Moreover, in the fine-particles feeder equipped with the vibrating feeder, there was also a trouble of the fine particles which have the inside of a gutter conveyed not dispersing around, or the fine particles which fall from a gutter having dispersed and not holding in a receiver thoroughly by electrification by a powerful oscillation being impressed to fine particles.

[0008] This invention was completed based on said situation. That is, the object of this invention is to cancel said Prior-art-technical problem. The object of this invention removes the charge of a particulate matter charged by oscillation of a vibrating feeder, prevents scattering and adhesion of fine particles, and is to offer the fine-particles feeder which can remove effectively the residual fine particles adhering to a fine-particles hopper and a gutter.

[0009]

[Means for Solving the Problem] In the fine-particles feeder equipped with the gutter which transports the fine particles discharged from the fine-particles hopper with which this invention for solving said technical problem has been arranged on a shaker, and this fine-particles hopper The fine-particles aspirator which has the appearance which imitates the inner surface of the appearance which imitates the inner surface of a fine-particles hopper, and said gutter possible [insertion], and was equipped with fine-particles attraction opening in said fine-particles hopper and the gutter, It is the fine-particles feeder characterized by coming to prepare for a fine-particles hopper and said gutter the humidification air atomiser which injects humidification air.

[0010]

[Function] In the fine-particles feeder of this invention, the fine-particles hopper and the gutter are arranged on a shaker. Therefore, the fine particles accumulated on the fine-particles hopper are sent out from a fine-particles hopper in response to the oscillation by the shaker to a gutter, and receiving an oscillation, fine particles have a gutter top conveyed, are sent out, and they go.

[0011] Humidification air is injected by the fine-particles hopper and the gutter with the humidification air atomiser. Therefore, fine particles are not charged in spite of receiving the oscillation by the shaker. Therefore, fine particles do not adhere to the wall of a fine-particles hopper and a gutter electrostatic, and fine particles do not disperse with static electricity.

[0012] But even if not charged, fine particles adhere to the wall of a fine-particles hopper and a gutter. Then, after supply of fine particles is completed, a fine-particles aspirator is inserted into a fine-particles hopper and a gutter, and fine particles are attracted from fine-particles attraction opening. In this case, since it will have few [that outside surface of the fine-particles aspirator inserted into the fine-particles hopper since it had the appearance which imitates the inner surface of a fine-particles hopper and the wall of a fine-particles hopper] clearances If the open air is attracted from fine-particles attraction opening, since a powerful attraction air current occurs from the outside of a fine-particles hopper to fine-particles attraction opening through said clearance, the residual fine particles which adhere to the wall of a fine-particles hopper with this attraction air current will be attracted into fine-particles attraction opening. Similarly, since a fine-particles aspirator will have few [the outside surface of the fine-particles aspirator inserted into the gutter since it had the appearance which imitates the inner surface of a gutter again and the wall of a gutter] clearances If the open air is attracted from fine-particles attraction opening, since a powerful attraction air current occurs from the outside of a gutter to fine-particles attraction opening through said clearance, the residual fine particles which adhere to the wall of a gutter with this attraction air current will be attracted into fine-particles attraction opening.

[0013]

[Example] One example of this invention is further explained to a detail, referring to a drawing.

[0014] As shown in drawing 1 , the fine-particles feeder 1 which is one example of this invention is equipped with the humidification air atomiser 6 as indicated in drawing 2 as a shaker 2, the fine-particles hopper 3, a gutter 4, and the fine-particles aspirator 5.

[0015] There is no limit especially as said shaker 2, especially as long as an oscillation can be given to the fine-particles hopper 3 and a gutter 4, there is no limit in the structure, and a well-known shaker can be adopted.

[0016] The fine-particles hopper 3 is arranged on said shaker 2. When this fine-particles hopper 3 is formed so that fine particles 7 may be accumulated and fine particles can be discharged from that lower part to a gutter 4, speaking functionally, and it is said in gestalt, it has opening 8 in the structure which can insert the fine-particles aspirator 5, for example, the upper part, and has the structure where it narrows toward the lower part.

[0017] A gutter 4 has the function to convey the fine particles 7 discharged from the opening 8 of the fine-particles hopper 3 by oscillation of a shaker 2, has the lateral portion set up on the base connected to the opening 8 of the fine-particles hopper 3, and both sides of the base, and has the gutter-shaped configuration which the upper part makes the open condition.

[0018] The fine-particles aspirator 5 has the fine-particles hopper insertion section 9 and the gutter insertion section 10. This fine-particles hopper insertion section 9 is equipped with the external wall surface which faces to the wall of the base and the fine-particles hopper 3 which go to the base of the fine-particles hopper 3, when it has the outside configuration which imitates the inner surface configuration of the fine-particles hopper 3 and that fine-particles hopper insertion section 9 is inserted into the fine-particles hopper 3. Much attraction openings 11 are established in the base of the fine-particles hopper 3. When the fine-particles hopper insertion section 9 is inserted into the fine-particles hopper 3, the gestalt of the fine-particles hopper insertion section 9 is designed so that the external wall surface of the fine-particles hopper insertion section 9 and the internal surface of the fine-particles hopper 3 may have few gaps, and so that it may have few [the base of the fine-particles hopper 3 and the base of the fine-particles hopper insertion section 9] gaps.

[0019] The gutter insertion section 10 is equipped with the outside surface which faces to the both-sides side wall of the base which goes to the base of a gutter 4, and a gutter 4, when it has the outside configuration which imitates the inner surface configuration of a gutter 4 and the gutter insertion section 10 is inserted into a gutter 4. Much attraction openings 11 are established in the base of a gutter 4. When the gutter insertion section 10 is inserted into a gutter 4, the gestalt of the gutter insertion section 10 is designed so that it may have few [the external wall surface of the gutter insertion section 10 and the both-sides side wall of a gutter 4] gaps, and so that it may have few [the base of a gutter 4 and the base of the gutter insertion section 10] gaps.

[0020] Although the fine-particles hopper insertion section 9 and the gutter insertion section 10 may be formed in another object, in this example, the fine-particles hopper insertion section 9 and the gutter insertion section 10 are formed in one. Since you can make it go up and down simultaneously the fine-particles hopper insertion section 9 and the gutter insertion section 10 by being formed in one, simplification of an elevator style (not shown) can be attained.

[0021] At the time of cleaning, the fine-particles hopper insertion section 9 and the gutter insertion section 10 are standing by above the fine-particles hopper 3 and a gutter 4, and they are formed possible [vertical movement] of the elevator style (not shown) so that it can descend toward the fine-particles hopper 3 and a gutter 4 at the time of cleaning.

[0022] The humidification air atomiser 6 is formed so that humidification air can be injected to the fine-particles hopper 3 and a gutter 4. It is arranged in the location which does not bar vertical movement thru/or insertion actuation of said fine-particles hopper insertion section 9 and the gutter insertion section 10. And in this example The 1st injection tip 12 of humidification air which carried out opening towards the upper part opening 8 of the fine-particles hopper 3, and has been arranged in the side of the fine-particles hopper 3, The 2nd injection tip 13 of humidification air which carried out opening towards said gutter 4, and has been arranged in the side of a gutter 4, It comes to have the humidification air generator 14 made to generate humidification air by supersonic vibration etc., and the piping 15 which supplies the humidification air generated with this humidification air generator 14 to said 1st injection tip 12 of humidification air, and the 2nd injection tip 13 of humidification air.

[0023] An operation of the fine-particles feeder of a configuration is explained below above.

[0024] Fine particles 7 are accumulated into the fine-particles hopper 3. An oscillation is added to the fine-particles hopper 3 and a gutter 4 with a shaker 2. The fine particles in the fine-particles hopper 3 move to a gutter 4 from opening 8 by oscillation, and fine particles 7 move in the base top of a gutter 4.

[0025] Humidification air is injected from the 1st injection tip 12 of humidification air by the upper part opening 8 of the fine-particles hopper 3. By carrying out the fuel spray of the humidification air to the fine particles accumulated into the fine-particles hopper 3, static electricity charged in fine particles by the oscillation by the shaker 2 is discharged. Humidification air is injected by the gutter 4 from the 2nd injection tip 13 of humidification air. By carrying out the fuel spray of the humidification air from the 2nd injection tip 13 of humidification air to the fine particles which move in the inside of a gutter 4, static electricity charged in fine particles by the oscillation by the shaker 2 is discharged.

[0026] Therefore, since electrified fine particles do not disperse, fine particles can be supplied to a receiver with an exact amount, fine particles are dispersed around this fine-particles feeder, and it does not pollute.

[0027] After migration of the fine particles from the fine-particles hopper 3 to a receiver 16 is completed, the fine-particles hopper insertion section 9 and the gutter insertion section 10 descend, and the fine-particles hopper insertion section 9 is inserted into the fine-particles hopper 3, and the gutter insertion section 10 is inserted into a gutter 4. The open air is attracted from attraction opening prepared in the base of attraction opening prepared in the base of the fine-particles hopper insertion section 9, and the gutter insertion section 10. Since it has few [the external wall surface of the fine-particles hopper insertion section 9 and the internal surface of the fine-particles hopper 3] gaps and has few [the base of the fine-particles hopper 3 and the base of the fine-particles hopper insertion section 9] gaps at this time, if the open air is attracted from attraction opening, the air current of the high speed passing through said gap arises from the outside of the fine-particles hopper 3, and the fine particles adhering to the internal surface of the fine-particles hopper 3 will **** to a high-speed flow, and will be absorbed in said attraction opening. In the gutter 4, similarly, when a high-speed flow leads to the gap of the outer wall of the gutter insertion section 10, and the both-sides wall of a gutter 4, the fine particles adhering to the both-sides inner surface and base of a gutter 4 are absorbed to attraction opening. The residual fine particles adhering to the fine-particles hopper 3 and a gutter 4 are thoroughly removed by performing attraction actuation of fixed time amount.

[0028] In spite of transporting fine particles using a shaker 2 according to this fine-particles feeder, static electricity of fine particles can be discharged effectively, attraction clearance of the fine particles which moreover remain can be carried out easily, and even if it becomes the situation where the class of fine particles which should be supplied is different, the contamination by the fine particles till then remaining can be prevented effectively. And conventionally, since clearance of fine particles is performed combining the humidification air atomiser 6 and the fine-particles aspirator 5, since it is not manual fine-particles clearance, unlike equipment, full automatic-ization of fine-particles supply can be attained.

[0029]

[Effect] Removing effectively static electricity charged in fine particles according to the fine-particles feeder of this invention, in spite of using a shaker, the residual fine particles adhering to a fine-particles hopper and a gutter are effectively removable, and when supplying the fine particles from which a class differs, even if it is, contamination by residual fine particles can be prevented.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Drawing 1 is the side-face explanatory view showing one example of this invention.

[Drawing 2] Drawing 2 is the flat-surface explanatory view showing one example of this invention.

[Description of Notations]

1 [... A gutter, 5 / ... A fine-particles aspirator, 6 / ... A humidification air atomiser, 7 / ... Fine particles, 8 / ... Opening, 9 / ... The fine-particles hopper insertion section 10 / ... The gutter insertion section, 11 / ... Attraction opening, 12 / ... The 1st injection tip of humidification air, 13 / ... The 2nd injection tip of humidification air, 14 / ... A humidification air generator, 15 / ... Piping.] ... A fine-particles feeder, 2 ... A shaker, 3 ... A fine-particles hopper, 4

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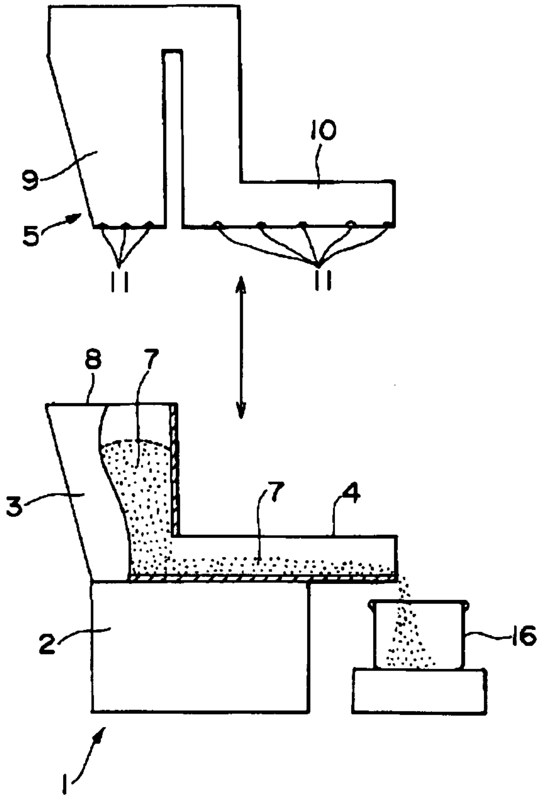
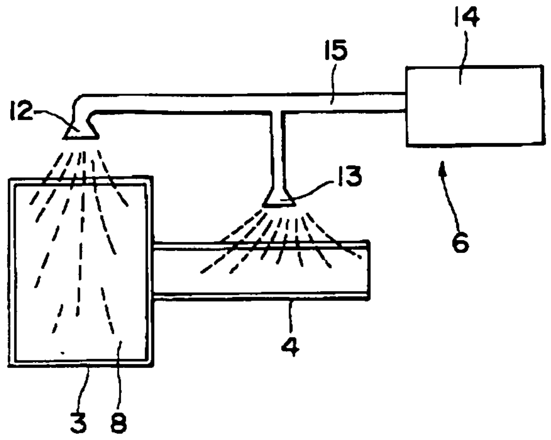
DRAWINGS

[Drawing 1]



[Drawing 2]



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